**IN THE UNITED STATES DISTRICT COURT FOR THE
EASTERN DISTRICT OF VIRGINIA
Richmond Division**

UNITED STATES OF AMERICA   )
)
          v.   )   Criminal No. 3:21-cr-42
)
KEITH RODNEY MOORE,   )
)
         Defendant.   )

<u>UNITED STATES' MOTION TO EXCLUDE DEFENSE EXPERT</u>

The defendant's expert, Dr. Eli Coston, offers opinions that rely on flawed data and use techniques that peer-reviewed research deems unreliable. Dr. Coston's opinions in this case fail to satisfy the standards in Fed. R. Evid. 702 and *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 589 (1993), standards that both define admissibility and more generally provide a framework for evaluating when expert testimony should be deemed reliable. *See also Sardis v. Overhead Door Corp.*, 10 F.4th 268, 281 (4th Cir. 2021) (reviewing standards governing expert testimony). Because Dr. Coston's opinions in this case cannot be deemed reliable, those opinions fail to support the defendant's Fourteenth Amendment challenge.

Briefly, Dr. Coston's analysis relies on data from Virginia's Community Policing Act, enacted in 2020, which mandates the collection of traffic stop data. But as law enforcement agencies across the commonwealth have begun implementing that Act, they have needed to refine their data collection, demonstrating that the initial data collected under the Act in its first six months —relied on by Dr. Coston—has serious flaws. Indeed, Virginia's General Assembly amended the Act in 2021 to address problems with the Act.[1] The initial problems with data

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[1] The General Assembly is also addressing bias-based profiling in other ways. For example, the General Assembly passed another law in 2020 that limited primary traffic offenses that could lead to a traffic stop. Virginia Legislative Information Session, *HB 5058*, https://lis.virginia.gov/cgi-bin/legp604.exe?202+sum+HB5058.

collection under the Act have been understandable but significant. For example, should officers record information about the driver of a vehicle stopped or about a passenger of the vehicle who was arrested? Should officers determine the race of persons stopped by asking them to volunteer their race, a procedure not well calculated to reassure those who have been stopped, or should the officers simply make their best estimate of the race of people stopped? What databases should be used for collecting the data, and how consistently has the data entry been collected during a stop? Because of the problems with the initial implementation of the Act, over 32% of the data that Dr. Coston relies on is incomplete, involves stops occurring outside of Richmond, and involves duplicate counting of the same stop. Collectively, these problems mean that Dr. Coston does not have reliable data about a simple threshold question—what percentage of the drivers (or passengers) stopped in the precinct where the defendant was stopped were African American?

But Dr. Coston's report has other serious flaws. It is of course not enough to know simply what percentage of drivers stopped were African American. The next basic requirement is to find some measure of the race of drivers on the road who could have been stopped (or searched or arrested) to compare with those who were actually stopped (or searched or arrested). Dr. Coston relies on census data to make that comparison. But as a consensus of researchers publishing peer-reviewed research on racial profiling have concluded, census data is not a reliable measure to compare against the racial composition of drivers stopped to identify potential bias. For starters, census data includes many people, like children, who are not even licensed to drive. But beyond that, for a host of reasons, who is driving on roads in a particular region may not mirror who lives in that region.

Worse, after possessing neither a reliable measure of the race of those stopped nor a reliable measure of the race of drivers in the relevant area, Dr. Coston then uses that deficient data to apply

statistical techniques that responsible researchers would regard as at best preliminary and exploratory and would not use to draw the conclusion that officers were committing equal protection violations in enforcing the law. Indeed, the state agency responsible for writing an official report based on the same data that Dr. Coston uses admits that the poor data quality forbids "any firm conclusions" about bias.[2]

I.   Legal Standards Governing Expert Testimony

Federal Rule of Evidence 702 provides that expert testimony must (a) "help the trier of fact . . . determine a fact in issue"; (b) be "based on sufficient facts or data"; (c) be "the product of reliable principles and methods"; and (d) "reliably appl[y] the principles and methods to the facts of the case." Under Rule 702, expert testimony must be reliable and relevant to the issues in a case. *Sardis*, 10 F.4th at 281. The Supreme Court's opinion in *Daubert* "provides four, non-exhaustive 'guideposts' to aid in the required reliability analysis: (1) whether the expert's theory or technique 'can be (and has been) tested'; (2) 'whether the theory or technique has been subjected to peer review and publication'; (3) 'the known or potential rate of error' inherent in the expert's theory or technique; and (4) whether the expert's methodology is generally accepted in his field of expertise." *Sardis*, 10 F.4th at 281 (quoting *Daubert*, 509 U.S. at 593–94; *Nease v. Ford Motor Co.*, 848 F.3d 219, 229 (4th Cir. 2017)). Moreover, even when an expert relies on valid data and uses valid techniques, "[a] court may conclude that there is simply too great an analytical gap between the data and the opinion offered." *Gen. Elec. Co. v. Joiner*, 522 U.S. 136, 146 (1997).

As explained below, Dr. Coston's opinions fail essentially every measure that an expert's opinion must meet to be reliable and relevant. Dr. Coston relies on flawed data that would render

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[2] Department of Criminal Justice Services, *Report on Analysis of Traffic Stop Data Collected under Virginia's Community Policing Act*, at 2 (July 1, 2021), https://www.dcjs.virginia.gov/sites/dcjs.virginia.gov/files/publications/research/report-analysis-traffic-stop-data.pdf ("DCJS Report").

meaningless any statistical analysis performed on that data and then uses techniques that are too simplistic to support the conclusions drawn.

Rule 702 applies even though this issue is not submitted to a jury. First, as Rule 702(a) provides, the Rule applies when the expert opinion "will help the trier of fact" to "determine a fact in issue." Here, this Court is the factfinder who must determine the facts in issue. "[D]istrict courts must apply Rule 702 to assess an expert's qualifications, reliability, and fit before weighing the expert's opinions to decide a triable issue." *UGI Sunbury LLC v. A Permanent Easement for 1.7575 Acres*, 949 F.3d 825, 832–33 (3d Cir. 2020) (citing Fed. R. Evid. 702 advisory committee's note to 2000 amendments ("The trial judge in all cases of proffered expert testimony must find that it is properly grounded, well-reasoned, and not speculative before it can be admitted."); *see also* Fed. R. Evid. 1101(a) (applying the Federal Rules of Evidence to proceedings before district courts)). But even if Rule 702 did not govern directly, the Rule provides a well-devised framework for assessing the reliability of expert testimony, and here, Dr. Coston's opinion fails to qualify as reliable and should be rejected by the Court.

Argument

I.   The data on which the defendant and his expert relies are unreliable and insufficient.

   A. The initial implementation of the Community Policing Act introduced multiple problems in the data the defendant's expert uses.

The data on which the defense expert relies has its genesis in the Community Policing Act, signed by the Virginia governor on April 11, 2020, in the early stages of the COVID-19 pandemic.[3] The Act was intended to prohibit "bias-based profiling" in policing and directed law enforcement

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[3] Virginia Legislative Information Session, *HB 1250*, https://lis.virginia.gov/cgi-bin/legp604.exe?201+sum+HB1250

agencies to collect data to "determine the existence and prevalence" of the practice. *Id.* The Act

required the collection of certain information for every motor vehicle stop by law enforcement:

> (i)   the race, ethnicity, age, and gender of the person stopped;
> (ii)   the reason for the stop;
> (iii)   the location of the stop;
> (iv)   whether a warning, written citation, or summons was issued or whether any persons were arrested;
> (v)   if a warning, written citation, or summons was issued or an arrest was made, the warning provided, violation charged, or crime charged; and
> (vi)   whether the vehicle or any person was searched.

Id. Law enforcement agencies then send the data to Virginia State Police (VSP), which is

responsible for assembling the data. *Id.* The data are available publicly.[4] The Virginia Department

for Criminal Justice Services (DCJS) must annually report on the data collected for the Governor,

the General Assembly, and the Attorney General. *Id.*

The Act provided no funding to Virginia's law enforcement agencies to implement the Act,

required data collection to begin less than three months after the Act became law, and took effect

during a pandemic while law enforcement agencies were losing personnel, addressing civil unrest,

and navigating surges in infections. Nor was there statewide training or guidelines on how to

collect and organize the data.

During the early implementation of the Act, some important ambiguities about how to

apply the Act became apparent. For example, the first subsections mandate the collection of only

the driver's information ("the person stopped"), but if "any person" is arrested or searched, then

the law enforcement officer is directed to record information for that person. When the person

arrested or searched was not the driver, how to collect data was unclear. Thus, if a driver was

pulled over for speeding, but law enforcement discovered the passenger had an outstanding

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[4] Virginia Open Data Portal, *Community Policing Act Data Collection*, https://data.virginia.gov/stories/s/Virginia-Community-Policing-Act-Data-Collection/rden-cz3h/.

warrant for failure to appear and arrested the passenger, the officers were left with a quandary as to whose information to record. The 2020 version of the statute would presumably direct that the biographical information of the driver be recorded with the offense information of the passenger, a result that made the collected data confusing and unilluminating. The 2021 updates to the statute addressed this problem by delegating broad regulatory power to VSP, and on July 1, 2022, VSP will require that law enforcement collect the above data for the driver and all passengers.[5]

The statute also creates obvious problems by directing law enforcement to determine race and ethnicity information by either asking the stopped citizen or by making their own guess. Race and ethnicity information is not collected by the Department of Motor Vehicles, and this information is not reflected on driver's licenses. Many law enforcement officers feel uncomfortable asking stopped and possibly irate citizens about their race and ethnicity, and feel that asking such personal questions will only exacerbate the preexisting tension of the traffic stop, so an officer's subjective determination of race and ethnicity is the only feasible option. Because VSP did not issue guidance or training on making racial and ethnic determinations, individual officers are left on their own to hazard their own subjective and untrained guesses as to race and ethnicity. Due to this, VSP officials have noticed an evolving statewide trend of officers not asking stopped citizens for their race or ethnicity, and thus an abnormally high number of "unknown" races reflected in the data.[6]

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[5]   The original version of the statute also called for data collection only in cases of motor vehicle stops, i.e., discretionary stops, in an effort to deter "bias-based profiling," Virginia Legislative Information Session, *HB 1250*, https://lis.virginia.gov/cgi-bin/legp604.exe?201+sum+HB1250, but VSP is aware of many instances where law enforcement, especially in the early months, collected data for checkpoints, traffic accidents, stalled vehicles, and calls for service. Indeed, the first training that VSP conducted for law enforcement agencies occurred in January 2022, which undermines the consistency and reliability of the data, especially early in the implementation period.

[6] Officers' identification of race or ethnicity during a stop may also fail to correspond to the identification of individuals' race or ethnicity in the census data that Dr. Coston relied on. As discussed below, Dr. Coston's use of census data also separately creates significant problems because census data fails to capture who is driving on roads within a defined region.

From the beginning, state officials from VSP and DCJS knew that, as with any new attempt

at mass data collection, that the rapid rollout would be bumpy, and it would be at least 3 to 5 years

before the data approached reliability. As described in DCJS's official report that covered from

July 1, 2020 to June 30, 2021, "**The information presented in this report is preliminary and

should be interpreted with caution.** This is largely because this was the first year that the

Community Policing Act was implemented. As the report notes, many PDs [police departments]

and SOs [sheriff's offices], especially smaller agencies with limited resources, faced challenges

establishing the data collection and reporting required under the Act." DCJS Report at 1. DCJS

officials have acknowledged that the first few months of data collection, in particular, showed

many inconsistencies in the data collected statewide: each law enforcement agency fashioned their

own data collection methods given the compressed implementation timeline; the pandemic

severely limited the number of personnel working at all or in the office; and civil unrest gripped

the state and nation beginning in late May 2020.

The City of Richmond and the Richmond Police Department (RPD) epitomized the

struggles that were occurring statewide in implementing the new law. RPD was not immune to the

effects of the pandemic, and the protests that began in late May 2020 were particularly an issue in

Richmond, ending only in mid-August 2020.[7] During the months-long protests, dozens of vehicles

and multiple buildings were burned (including at least one police cruiser and a transit bus that were

completely destroyed), countless instances of vandalism occurred, and five heavy statues were

toppled, posing the risk of serious injury. These events demanded many hours of police resources,

stretching RPD thin. During that time RPD experienced turnover in leadership, having three

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[7] *See, e.g.*, Autumn Childress, *One Year Later: How George Floyd's Death Impacted Richmond* (May 25, 2021), https://www.wric.com/news/local-news/richmond/one-year-later-how-george-floyds-death-impacted-richmond/.

permanent or acting police chiefs in the three-week period leading up to the effective date of the new law.[8] The effective date of the new law could hardly have come at a worse time for RPD.

In RPD's first attempt to comply with the Community Policing Act requirements, it created a Google Form, a part of the Google Docs suite that allows a user to create an online survey interface that inputs responses into a spreadsheet. RPD placed a link to the Google Form on the desktop of the computer terminals in patrol vehicles, but the frenetic circumstances prevented the training that would have been ideal for the rollout of a new program. Many officers failed to record properly the data required under the new Act, and there was no verification mechanism to identify errors. This flaw in the rollout means that data from the initial period after the Act became effective is incomplete and unreliable.

For example, the data include many instances of duplicates in the RPD data: multiple "stops" that occurred at the same location on the same day, with the same driver age, sex, statutory section violated, and post-stop outcomes. These duplicates could occur if an officer accidentally submitted the same entry multiple times, or if an officer submitted multiple entries for the same driver because the officer had issued the driver multiple summons during a single stop—such as for speeding, a broken taillight, and expired registration.[9]

During the rollout, RPD was late submitting its data for the months of December 2020 and January 2021 and did not submit that data until July 2021. Consequently, that data was not included in the 2021 DCJS report to state officials. During this time, VSP was unable to perform quality checks that would have improved data integrity and instead simply ensured nothing was blank.

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[8] *Blackwell Resigns as Interim Chief, Stoney Appoints New Police Chief from NC (*June 26, 2020), https://www.nbc12.com/2020/06/26/blackwell-resigns-interim-chief-stoney-asks-deputy-chief-nc-take-over/.

[9] Officers were instructed to record only the most serious statute violated, which explains why multiple entries would have the identical statutory section violated if an officer simply input each summons into the Google Form.

Because of these data integrity issues both in Richmond and across the commonwealth, DCJS does not know how much "noise" or error is in the data from the initial rollout, undermining confidence about conclusions coming from that data. In fact, DCJS believes that a statistically valid analysis is impossible at this point due to poor data quality.

> B. *Subsequent improvements after the relevant period of this case demonstrate the shortcomings of the data in the relevant period.*

After a bumpy start, RPD began making significant improvements beginning in February 2021. This was when RPD transitioned away from Google Forms and began integrating data collection for the Community Policing Act into the department's existing records management system, which led to improved data integrity. Leading up to the new requirements effective July 1, 2022, that require data for all vehicle occupants be logged, RPD will further integrate the data collection process into the existing workflow for completing a traffic stop, which should further improve data quality.

VSP has also been making improvements in how it handles data collected under the Act. In early 2021, VSP began requiring that an incident number be added to each data entry to allow linking back to the underlying police record, such as the police report or traffic ticket. This allowed agencies like RPD to cross check and verify Community Policing Act reports to more accurate underlying records that have long been collected. The legislature's grant of regulatory authority to VSP in 2021 has also allowed VSP to promulgate requirements for expanded and consistent data from all jurisdictions, including the requirement effective July 1, 2022, that the data for all vehicle occupants be collected.

9

II.   **Dr. Coston's analysis relies on faulty data, bad benchmarks, and statistical tests that peer-review research deems insufficient.**

     A. *Dr. Coston's opinion is not "based on sufficient facts or data" under Fed. R. Evid. 702(b).*

The data on which Dr. Coston relies are riddled with errors, which should not be surprising given the law's accelerated rollout amidst numerous operational challenges, as described above. Over 32% of the Community Policing Act data that underlies the defense expert's report is faulty, and that is merely the known rate of error. The plentiful errors so seriously undermine the quality of the data and the analyses based on the data that Dr. Coston's work does not begin to meet *Daubert* standards. It is also telling that Dr. Coston's report neither examines the integrity of the data on which it relies nor qualifies the report's conclusions as being subject to unexamined flaws in the data.

     1.   Dr. Coston's report includes data that DCJS excluded for lack of reliability

Dr. Coston's departure from reliable statistical methods is underscored by Dr. Coston's reliance on data that DCJS, the state agency tasked with analyzing the data from the Act for state decisionmakers, excluded because it was unreliable. For example, DCJS excluded all data that were not "reported completely" per VSP's requirements. DCJS Report at 17. This means that a traffic stop was excluded from the analysis if all the data for a stop was not validly completed.

Dr. Coston failed to exclude these data and thus included them in the analysis. The data Dr. Coston used for the defense's analysis contained 147 rows out of 2578 rows where no age was recorded, 6 rows with no gender, 5 rows with no value for action taken as a result of the stop, 2 rows with no value for whether the person was searched, and 266 rows with no value for whether a passenger was arrested. In all, more than 14% of Dr. Coston's data was rejected by DCJS.

2.   Dr. Coston introduced or failed to notice additional errors

Dr. Coston's data also includes 209 instances of stops that are identified as occurring outside of Richmond, including some as far as Ruckersville, Scottsville, and Howardsville—far-flung locations from Richmond. Dr. Coston claimed to use a service called Geocodio to convert the location information into latitude and longitude and that an intern with the Public Defender's Office checked and corrected "all locations with less than a .6 accuracy score." Dkt. 66-1 at 4. Dr. Coston then "verified a random selection of these" (presumably the locations checked by the interns), *id.*, and excluded 82 stops as outside RPD's jurisdiction. But Dr. Coston offers no explanation for including the other 127 stops that are identified as occurring outside Richmond, or how these errors made their way into the analysis in the first place.

The location analysis is a comedy of errors. For example, one of the entries is for a stop that occurred at "Broad / Harrison," but Dr. Coston's latitude and longitude coordinates resolve to Scottsville, a town approximately as far west of Richmond as Charlottesville. Apparently, Geocodio, the FPD interns, or Dr. Coston interpreted an RPD stop occurring at "Broad / Harrison" as having occurred at Bird St. and Harrison St. in Scottsville, nearly 70 miles away. Another stop was recorded at "1800 Oliver hill," but Dr. Coston's coordinates point to Oliver Lane in Ruckersville, north of Charlottesville and over 80 miles away from 1800 Oliver Hill Way in Richmond. One final example is an obvious location error. The data record a stop as having occurred at "9th and E Main St," but the coordinates from Dr. Coston plot to a similar address in Charlottesville—in fact, right on Charlottesville's famous downtown mall.

These data errors are significant. First, Dr. Coston apparently failed to investigate the coordinates that Geocodio listed as having an accuracy score of greater than .6, and Dr. Coston also offers the Court no indication of the accuracy of Geocodio. Given the results above, Dr.

11

Coston's uncritical and unexplained use of the geomapping tool raises serious questions that undermine the conclusions in Coston's report that rely on location information, such as the maps, clusters, and heat mapping. Dkt. 66-1 at 8-11. Second, Coston reports the number of stops outside RPD's jurisdiction as only 82, but the actual number based on Coston's own latitude and longitude coordinates is 209.

There are further problems with the data—namely, that there are 321 instances of exact duplicates in Coston's data set. These multiple entries with identical information could be the result of several errors. Officers may have submitted the Google Form multiple times or inputted data in the Google Form for every summons given, such as when a driver receives a summons/ticket for speeding, expired registration, and broken taillight during the same stop.

The duplicate data appears difficult to treat as representing separate stops. For example, on November 21, 2020, there are four entries for a 44-year-old black woman pulled over at B1200 Mosby St for illegal use of defective or unsafe equipment. Each of the "four women" were given a warning. It hardly needs to be said that it is very unlikely that four people of the same race, gender, and age committed the same statutory violation and were pulled over at the same location on the same day with identical results. These results should have been noticed, identified, and excluded, but were not.

Dr. Coston either failed to notice the variety of errors in the data described above or failed to inform the Court about those issues. This itself is a violation of *Daubert* principles—it is not generally accepted in the scientific community to use a new data set that is littered with problems and perform little to no quality control. The sum total of these errors leads to the exclusion of more than 32% of the data on which Dr. Coston's analysis rests, and this is only the known error rate. The unknown error rate, including stemming from frontline officers forgetting or failing to comply

with the requirements of the new Act in the first few months of implementation while they certainly had their hands full, could be much more. In short, Dr. Coston's work relies on deficient data that lacks reliability and would undermine any statistical analysis that depends on that data.

> 3. Even if the traffic stop data were minimally acceptable, *Daubert* would still bar Coston's analysis because census data fails to provide an adequate measure of who is driving on the roads within a given region.

Even if the traffic stop data Dr. Coston used had no problems, Dr. Coston's opinion would still be unreliable due to its reliance on a poor research design. The most egregious problem with Dr. Coston's analysis is the decision to compare general population census data to the stop data to determine if there exists a racial disparity in stops. As explained by Dr. Michael Smith, the United States' retained expert who regularly publishes in peer-reviewed journals on this subject and is one of the nation's leading researchers in racial bias in policing, the improper use of census data alone is sufficient to strike Dr. Coston's report because using census data as a benchmark falls far outside scientific norms:

> Today, census-based benchmarking is no longer accepted as a scientifically valid technique for comparing against police traffic stop data. First generation studies, including our original Richmond study, used census or age-adjusted (aged 15-16 and older) census data to compare against the racial composition of drivers stopped by the police (Smith et al., 2021). Census data is free and readily available and makes a convenient benchmark. Unfortunately, as later comparative studies made clear (see Alpert et al., 2004), the population of persons who *live* in an area often serves as a poor representation of persons who *drive* in an area or who are *at risk* for being stopped by the police. Census benchmarking does not account for out-of-area drivers, differential exposure to the police due to differences in police deployment patterns within a city or state, or differences in driving behavior across racial groups (Ridgeway & MacDonald, 2010; Smith et al., 2019; Tillyer et al., 2010), among other factors. While all benchmarks suffer from certain limitations, census-based benchmarks are so far off the mark as valid estimates of the actual driving and/or traffic violating populations that informed social scientists should no longer use them (Ridgeway & MacDonald; Smith et al., 2021).

Exhibit A, Expert Report of Dr. Michael Smith, Esq., at 2.

Dr. Smith explores several other benchmarking methods in his report, such as direct observation, a "veil of darkness" analysis, or estimating driver race using data from traffic accidents. *Id.* at 2-3. The defendant chose not to pursue direct observation; a veil of darkness analysis is not possible based on the Community Policing Act data because of its poor quality; and the United States is unaware of any Richmond-specific traffic accident estimates, and the defense did not conduct one.

DCJS, the state agency tasked with analyzing the Community Policing Act data, agrees with Dr. Smith that general population census data should not be used and provides an invalid comparison. DCJS also explored the three options Dr. Smith described, but abandoned each in turn because each was infeasible for a statewide analysis statutorily based on the Community Policing Act data. Instead, DCJS used age-adjusted census data, an estimate of the number of residents in a particular area that were eligible to drive, which is, "at best, a crude measure" of the driving population. DCJS Report at 65. This is because only the driving population is "exposed to potential traffic stops," "[s]ome residents do not drive at all" or only rarely drive, and "some racial/ethnic groups may be more likely than others to use public transportation rather than drive." *Id.* Thus, given that an age-adjusted census measure is "at best, a crude measure," it is indefensible for Dr. Coston to use a general population census benchmark that inexplicably includes 0-14 year-olds despite their categorical inability to legally drive. Moreover, if the ratio of different racial and ethnic groups vary for different age groups, the inclusion of age groups that do not drive or seldom drive would further undermine the accuracy of census data for capturing who is driving in a region.

DCJS officials and Dr. Smith are unaware of any scientific literature that supports the use of general census benchmarks. The complete lack of support for Dr. Coston's analysis in the

14

literature and its non-existent use among those who actually study and publish in the field of police racial profiling further dooms the defense's analysis under *Daubert*.

Another problem that limits all approaches that rely on census data is that they fail to account for non-residents being stopped while driving through a particular area. Drivers are not only stopped or ticketed in their own neighborhoods, but Dr. Coston's approach assumes this to be true, especially when overlaying the stop data over a map of Richmond showing the racial race distribution of the population. Dkt. 66-1 at 8-11. According to DCJS, "[m]any localities have high numbers of drivers from different racial/ethnic groups who are passing through the locality – and subject to being stopped – but who are not residents and therefore are not counted in the localities' resident population figures. These nonresident driver stops can skew measures of traffic stop disparities for such localities." DCJS Report at 8. Richmond sits at the crossroads of I-95 and I-64, is surrounded by suburbs, has numerous businesses within city limits, and contains Virginia Commonwealth University,[10] all of which indicate countless nonresident drivers, but Dr. Coston has no way to account for them.

It is further unrealistic to assume, as Dr. Coston does, that the race of those stopped by police will match the race of the local residents. DCJS and Dr. Smith both agree there are numerous reasons to question this simplistic assumption of Coston's. "*Police typically deploy more officers to neighborhoods with higher crime rates and which generate more calls for service. Moreover, modern police crime control strategies increasingly rely on the deployment of officers to crime 'hot spots' where crime mapping indicates offenses have recently occurred and are expected or predicted to occur again.*" Exhibit A, Dr. Smith Report at 3 (citations omitted; emphasis added).

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[10] VCU's presence within the 4th Precinct further complicates the analysis. VCU is more racially diverse than the rest of the 4th Precinct. Data USA, *Virginia Commonwealth University*, available at https://datausa.io/profile/university/virginia-commonwealth-university (last accessed April 8, 2022). This is yet another important variable that Dr. Coston neglected and left unexamined.

DCJS adds in its report that research indicates some reasons other than bias for disproportionate rates of traffic stops include "[d]ifferent driving rates or patterns by different racial groups, (perhaps linked to differences in housing or employment locations, in use of public transportation, etc.)[;] [d]ifferent rates of policing in different areas (racial minorities may be more likely to drive in or through higher-crime areas, which are policed more than other areas)[; and] [d]ifferent agency practices (some law-enforcement agencies differ on how much discretion they give officers in deciding when to make a stop)." DCJS Report at 8. Thus, crime rates and calls for service create demand for additional law enforcement in an area, which may explain why some areas of any city experience more traffic stops than others. This neutral, commonsense crime prevention strategy is non-discriminatory and eminently reasonable.

Richmond crime rates do in fact vary significantly by precinct, which supports the points raised by both Dr. Smith and DCJS. From July 1 to December 5, 2020 (the date of the relevant stop), crime was not evenly distributed among the precincts but was instead concentrated in Precincts 1, 2, and 4 for violent crimes and focused in Precincts 1 and 4 for all crimes. Richmond Police Department, Crime Incident Information Center, apps.richmondgov.com/applications/CrimeInfo.

Precinct	Percentage of Violent Crime[11]	Percentage of Total Crime	Percentage of Traffic Stops[12]
1	30.1%	27.8%	27.4%
2	28.5%	22.5%	17.1%
3	17.6%	22.7%	19.8%
4	23.9%	27.1%	35.8%

[11] The violent crime category includes homicides, sex offenses, robberies, and assaults.

[12] Of the 2369 stops that occurred within Richmond in Coston's data (excluding the 209 that fall outside Richmond), 649 of the stops occurred in Precinct 1, 404 in Precinct 2, 469 in Precinct 3, and 847 in Precinct 4. Precinct locations for the stops were obtained by inserting Coston's calculated latitude and longitude values (or corrected values, if any) into the Richmond GIS mapping application, which can overlay police precincts. ArcGIS, Richmond GIS, https://www.arcgis.com/home/webmap/viewer.html?panel=gallery&layers=1919069137714e27be683c3247a68fca.

16

Adding the column for traffic stops from Dr. Coston's data provides an illuminating comparison. The traffic stop percentages, with slight variations, closely track the violent and total crimes percentages. This is revealing because, as the defendant has repeatedly made clear, Precincts 1, 2, and 4 are overwhelmingly African American while Precinct 3 is more white. *See, e.g.*, Dkt. 66 at 6. The percentage of traffic stops hews far more closely to underlying crime rates than to race generally. That traffic stop percentages closely track underlying crime rates is powerful evidence that undercuts Dr. Coston's conclusion that race is a primary reason for traffic stops; instead, it appears crime rates are at least a significant confounding variable.

Dr. Coston's analysis shows at best "only *where* people drive and *who they are* (race) but account for none of the factors that otherwise influence the racial composition of traffic stops or how or why they occur in some areas more than others." Exhibit A, Dr. Smith Report at 3. By failing to account for the myriad reasons for a traffic stop besides race, Coston's report falls far short of the standard required under Rule 702. *Id.* at 4 ("I have never seen an analysis like this in a peer-reviewed scientific publication, and for good reason. The scientific community of scholars who study racial disparities in traffic stops would not accept this type of analysis to support an inference of racial bias in traffic stops."). The traffic stop percentages are a perfect example. Dr. Coston claims race is a key driver of traffic stops, but it also appears that crime rates are a good predictor. The relationship among these variables is unclear: race and crime rates are likely significantly correlated, but the causal relationship is ambiguous. *See* Exhibit A, Dr. Smith Report at 5-7 (discussing the strict requirements to determine causation). There may be other factors that similarly are ingredients in the correlative soup: socioeconomic status, education, average home values, percentage of homeowners versus renters, etc. But Dr. Coston's analysis ignores the

17

unending complexity of these other variables and simply asserts that race causes an increase in traffic stops because the two variables correlate in an indeterminate way.

Another key weakness of Dr. Coston's analysis design is that they attempt to answer whether officers in the 4th Precinct violated the defendant's rights using citywide data. Whatever the reason for Coston's choice to ignore the precinct locations in her analysis, this decision further weakens the report's value in adjudicating whether an equal protection violation occurred in this case. The officers that initiated the traffic stop of the defendant were members of the 4th Focus Mission Team, were restricted to the 4th Precinct, and had no control over the precinct boundaries. *See, e.g.*, Dkt. 66 at 8 (faulting RPD for the precinct boundaries). The relevant unit of analysis is the 4th Precinct. Expanding the analysis to the rest of the city is unhelpful and fails to identify similarly situated persons for purposes of the Equal Protection Clause. RPD has chosen to exercise its executive prerogative by organizing racially heterogeneous precincts. By mixing together the stop results from the different precincts, Dr. Coston sacrifices accuracy and relevance for the sake of convenience.

4. Even apart from the problems with the data Dr. Coston uses, the statistical techniques that Dr. Coston relies on are insufficient.

After all the issues with the data and Dr. Coston's research design extensively noted above, the chosen statistical analysis is also severely lacking and well outside the norm for research in the field of racial profiling. Coston acknowledges that a regression analysis is most commonly used for answering whether race causes disproportionate number of stops, Dkt. 66-1 at 4, and Dr. Smith explains why—regression allows a researcher to statistically "isolate the influence of one variable on the outcome of interest while controlling for other known influences that may themselves be correlated with the outcome." Exhibit A, Dr. Smith Report at 5. That is precisely one of the questions before the Court: is race the cause of traffic stops generally, and in this case, or is it due

to something else? But Dr. Coston chose not to use a regression analysis, and did not control for any other factors that may have contributed to who was stopped or what outcomes they received. Much like a doctor arrives at the proper diagnosis by considering and rejecting alternatives, so too do racial bias researchers attempt to eliminate alternatives by including them as independent variables (police enforcement patterns, background crime rates, race, calls for service, socioeconomic status, etc.) and measuring changes in the dependent variables (stops, arrests, searches, etc.).

Coston ignores the well-established need to account for alternative explanations. Coston chose not to utilize a regression analysis due to alleged "interrelationships among the independent variables," but that point hardly demonstrates the validity of the crude analysis Coston chose to rely on. Researchers have long understood that "police deployment variables often correlate with race and ethnicity in America's urban neighborhoods." Exhibit A, Dr. Smith Report at 3 (citing Tomaskovic-Devey et al. (2004)). The key is remembering that disproportionate police action does not violate equal protection principles merely for being disproportionate, but only if the motivation for the actions causing the disproportionate effect are race-based. *Central Radio Co. v. City of Norfolk, Va.*, 811 F.3d 625, 635 (4th Cir. 2016). By failing to separate or control for the legitimate reasons for a disparity in stops from the illegitimate, Coston's analysis becomes irrelevant—even setting aside the deep problems with the data used.

There certainly are legitimate reasons for disparities in stops, searches, and arrests that Dr. Coston does not consider or evaluate.[13] For example, Dr. Coston fails to control for the severity of

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[13] Well-established RPD policies also prohibit the sort of biased policing that the defendant suggests is rampant. Richmond Police Department, General Order on Constitutional Rights at 1 (eff. Feb. 11, 2019) ("All citizens of this country, under the Constitution, are guaranteed certain basic rights. It is the policy of the Richmond Police Department to safeguard these rights without bias . . ."); Richmond Police Department, General Order on Bias Reduction at 1 (eff. Feb. 13, 2018) ("Department employees shall exercise duties, responsibilities, and obligations in a manner that does

the reason for the stop (drivers stopped for a more serious crime are more likely to be subject to further scrutiny, like driving while drunk versus failing to use a turn signal), and low discretion arrests like arrests on outstanding warrants or searches like searches incident to arrest. Dr. Coston's failure to control for these other outcomes and conduct a simple analysis based only on two variables—race and stop data—is "not scientifically supportable" for the reasons described by Dr. Smith. Exhibit A, Dr. Smith Report at 5. In essence, and as anyone who has taken an introductory statistics class can attest, Coston has committed the gravest sin of statistics: mistaking correlation for causation. By showing only correlation and choosing a statistical test that cannot even begin to show causation, Coston's analysis is worthless to the question before the Court.

Contrasting Dr. Coston's work with a recent profiling case from North Carolina highlights the deficiencies of their work. As described more fully by Dr. Smith, *id.* at 6-7, in *United States v. Johnson*, 122 F. Supp. 3d 272 (M.D.N.C. 2013), the federal government sued a county in North Carolina, alleging the county unconstitutionally subjected Hispanic drivers to greater scrutiny and enforcement than other drivers. The government's expert in that case, Dr. John MacDonald, was a respected and "highly qualified criminologist" who utilized a regression analysis that included many independent variables to determine the effect of each one of the dependent variables (stops, arrests, searches, etc.). Exhibit A, Dr. Smith Report at 6-7. The Court rejected Dr. MacDonald's work because, even though he attempted to control for as many variables as possible, he could not control for the seriousness of the driver's conduct, which may have explained the disparate arrest and citation outcomes for the Hispanic drivers. Similarly, for his analysis on searches, the Court rejected his testimony because he could not control for non-discretionary searches. Without

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not discriminate on the basis of race . . ."); *id.* at 2 ("Officers are strictly prohibited from engaging in bias-based policing/profiling. All complaints of bias-based policing/profiling shall be thoroughly investigated . . ."). Full copies of these policies are attached as Exhibit B.

controlling for these other possible factors, an expert cannot say with any degree of confidence that a similarly situated racial group received a different outcome because of race, or, in other words, that race *caused* the disparate outcomes. Dr. MacDonald's analysis in *Johnson* was rejected for failing to exclude plausible alternative theories. Dr. Coston's report does not even consider alternative theories, and should be rejected entirely.

Indeed, Dr. Coston's report is merely a less sophisticated version of the analysis performed in the 2021 DCJS report, but the authors of the DCJS report—writing under statutory command to provide relevant and accurate information to decisionmakers—were very forthcoming about the limitations of their report and acknowledged its severe limitations in answering the question of whether the disparities they found were due to bias or other factors. DCJS Report at 8-10.

For the myriad reasons explained above, it is no exaggeration to say that Dr. Coston's report fails literally every single *Daubert* factor: "(1) whether the expert's theory or technique 'can be (and has been) tested'; (2) 'whether the theory or technique has been subjected to peer review and publication'; (3) 'the known or potential rate of error' inherent in the expert's theory or technique; and (4) whether the expert's methodology is generally accepted in his field of expertise." *Sardis*, 10 F.4th at 281 (citations omitted). Many theories about racial bias in policing have been tested, but Dr. Coston's work falls far outside the norm of generally accepted scientific standards and would be subject to scathing peer review. If the Court looks solely at the data Dr. Coston relied on, the known rate of error is at least 32%, and the unknown rate of error from poor or nonexistent initial Community Policing Act data combined with general population census data further renders Dr. Coston's conclusions plainly unreliable. These data integrity issues, many of them of Dr. Coston's own creation, demonstrate the lack of consistent and reliable standards. Simply put, Dr. Coston's analysis is wholly unreliable and insufficient.

21

Conclusion

There is no evidence besides Dr. Coston's fatally flawed analysis that police targeted the defendant (or anyone else) for selective enforcement of the law in violation of the Constitution's guarantee of equal protection. Because Dr. Coston's work does not meet the minimum requirements of Daubert and Rule 702, the Court should deny the defendant's late-filed request to dismiss the indictment.

Respectfully submitted,

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